

PROJECT: 8.2752101 (B-3926)

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# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

### GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.2752101 I.D. NO. B-3926  
F.A. PROJECT BRZ-1340(4)  
COUNTY WATAUGA  
PROJECT DESCRIPTION \_\_\_\_\_

SITE DESCRIPTION BRIDGES 35 & 36 ON  
SR-1340 OVER MEAT CAMP CREEK

DRAWN BY: JW MANN

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3926	1	25
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.2752101	BRZ-1340(4)	P.E.	
CONST.			

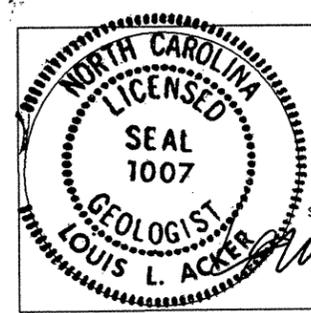
### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

INVESTIGATED BY LL ACKER PERSONNEL J.T. WILLIAMS  
CHECKED BY W.D. FRYE L.E. LANKFORD  
SUBMITTED BY W.D. FRYE T.P. DANIEL  
DATE AUGUST 2003



SEAL  
SIGNATURE L. Acker

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																	
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>	<p><b>WELL GRADED</b>- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM. INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p><b>GAP-GRADED</b>- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: <b>ANGULAR</b>, <b>SUBANGULAR</b>, <b>SUBROUNDED</b>, OR <b>ROUNDED</b>.</p> <p style="text-align: center;"><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;"><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE      LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE    LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE        LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; font-size: small;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt;10%</td> <td>&gt;20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> <p style="text-align: center;"><b>GROUND WATER</b></p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.  STATIC WATER LEVEL AFTER 24 HOURS.  PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA  SPRING OR SEEPAGE</p> <p style="text-align: center;"><b>MISCELLANEOUS SYMBOLS</b></p> <table border="0" style="width: 100%; font-size: x-small;"> <tr> <td> ROADWAY EMBANKMENT WITH SOIL DESCRIPTION</td> <td> SPT DMT DPT TEST BORING</td> <td> SAMPLE DESIGNATIONS</td> </tr> <tr> <td> SOIL SYMBOL</td> <td> AUGER BORING</td> <td>S - BULK SAMPLE</td> </tr> <tr> <td> ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS</td> <td> CORE BORING</td> <td>SS - SPLIT SPOON SAMPLE</td> </tr> <tr> <td> INFERRERD SOIL BOUNDARIES</td> <td> MONITORING WELL</td> <td>ST - SHELBY TUBE SAMPLE</td> </tr> <tr> <td> INFERRERD ROCK LINE</td> <td> PIEZOMETER INSTALLATION</td> <td>RS - ROCK SAMPLE</td> </tr> <tr> <td> ALLUVIAL SOIL BOUNDARY</td> <td> SLOPE INDICATOR INSTALLATION</td> <td>RT - RECOMPACTED TRIAXIAL SAMPLE</td> </tr> <tr> <td> DIP/DIP DIRECTION OF ROCK STRUCTURES</td> <td> SPT N-VALUE</td> <td>CBR - CBR SAMPLE</td> </tr> <tr> <td> SOUNDING ROD</td> <td> SPT REFUSAL</td> <td></td> </tr> </table> <p style="text-align: center;"><b>ABBREVIATIONS</b></p> <table border="0" style="width: 100%; font-size: x-small;"> <tr> <td>AR - AUGER REFUSAL</td> <td>PMT - PRESSUREMETER TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>SD - SAND, SANDY</td> </tr> <tr> <td>CL - CLAY</td> <td>SL - SILT, SILTY</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>SLI - SLIGHTLY</td> </tr> <tr> <td>CSE - COARSE</td> <td>TCR - TRICONE REFUSAL</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>γ - UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>γ<sub>d</sub> - DRY UNIT WEIGHT</td> </tr> <tr> <td>e - VOID RATIO</td> <td>w - MOISTURE CONTENT</td> </tr> <tr> <td>F - FINE</td> <td>v - VERY</td> </tr> <tr> <td>FOSS - FOSSILIFEROUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>FRAC - FRACTURED</td> <td></td> </tr> <tr> <td>FRAGS - FRAGMENTS</td> <td></td> </tr> <tr> <td>MED - MEDIUM</td> <td></td> </tr> </table>	ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE	ROADWAY EMBANKMENT WITH SOIL DESCRIPTION	SPT DMT DPT TEST BORING	SAMPLE DESIGNATIONS	SOIL SYMBOL	AUGER BORING	S - BULK SAMPLE	ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS	CORE BORING	SS - SPLIT SPOON SAMPLE	INFERRERD SOIL BOUNDARIES	MONITORING WELL	ST - SHELBY TUBE SAMPLE	INFERRERD ROCK LINE	PIEZOMETER INSTALLATION	RS - ROCK SAMPLE	ALLUVIAL SOIL BOUNDARY	SLOPE INDICATOR INSTALLATION	RT - RECOMPACTED TRIAXIAL SAMPLE	DIP/DIP DIRECTION OF ROCK STRUCTURES	SPT N-VALUE	CBR - CBR SAMPLE	SOUNDING ROD	SPT REFUSAL		AR - AUGER REFUSAL	PMT - PRESSUREMETER TEST	BT - BORING TERMINATED	SD - SAND, SANDY	CL - CLAY	SL - SILT, SILTY	CPT - CONE PENETRATION TEST	SLI - SLIGHTLY	CSE - COARSE	TCR - TRICONE REFUSAL	DMT - DILATOMETER TEST	γ - UNIT WEIGHT	DPT - DYNAMIC PENETRATION TEST	γ <sub>d</sub> - DRY UNIT WEIGHT	e - VOID RATIO	w - MOISTURE CONTENT	F - FINE	v - VERY	FOSS - FOSSILIFEROUS	VST - VANE SHEAR TEST	FRAC - FRACTURED		FRAGS - FRAGMENTS		MED - MEDIUM		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p><b>WEATHERED ROCK (WR)</b>  NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES &gt; 100 BLOWS PER FOOT.</p> <p><b>CRYSTALLINE ROCK (CR)</b>  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b>  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <p style="text-align: center;"><b>WEATHERING</b></p> <p><b>FRESH</b> ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V. SLI.)</b> ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p><b>SLIGHT (SLI.)</b> ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p><b>MODERATE (MOD.)</b> SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p><b>SEVERE (SEV.)</b> ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i></p> <p><b>VERY SEVERE (V. SEV.)</b> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i></p> <p><b>COMPLETE</b> ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p> <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <p><b>VERY HARD</b> CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p><b>HARD</b> CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p><b>MODERATELY HARD</b> CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p><b>MEDIUM HARD</b> CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p><b>SOFT</b> CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p><b>VERY SOFT</b> CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.</p>	<p><b>ALLUVIUM (ALLUV.)</b> - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p><b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (F.P.)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM.)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (R.Q.D.)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.</p> <p><b>STRATA CORE RECOVERY (SREC)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p><b>TOPSOIL (T.S.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> <p><b>BENCH MARK: BM #1 R/R SPIKE SET IN 22' LOCUST</b> -BL- 34+36 52' LEFT ELEVATION: 3541.98'</p> <p><b>NOTES:</b></p>																																																																																																																																																											
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<input type="checkbox"/> BK-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER																																																																																																																																																																																																																																			
<input type="checkbox"/> CME-45	<input type="checkbox"/> 8" HOLLOW AUGERS																																																																																																																																																																																																																																			
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VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED > 4 FEET																																																																																																																																																																																																																																		
WIDE	3 TO 10 FEET	THICKLY BEDDED 1.5 - 4 FEET																																																																																																																																																																																																																																		
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET																																																																																																																																																																																																																																		
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED 0.03 - 0.16 FEET																																																																																																																																																																																																																																		
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED 0.008 - 0.03 FEET																																																																																																																																																																																																																																		
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

August, 2003

STATE PROJECT: 8.2752101 (B-3926)  
COUNTY: Watauga  
DESCRIPTION: Bridges No. 35 and 36 on SR-1340 over Meat Camp Creek  
SUBJECT: Geotechnical Report – Foundation Investigation

#### Site Description

This project is located in northern Watauga County, on Meat Camp Road (SR-1340) approximately 4 miles west of the junction with NC 194. Meat Camp Road is intersected by SR-1399 about halfway between Bridges 35 and 36.

Meat Camp Creek is a bold, trunk stream tributary to the South Fork of the New River. Bridges No. 35 and 36 are about 1000 feet apart and lie on a section of the creek where it flows from a broad alluvial plain into a narrow valley segment with a steep gradient. Bridge 36 lies at the end of the alluvial plain and Bridge 35 lies downstream within the constricted valley.

The stream is 10 to 20 feet wide in a very bouldery channel with bouldery, floodplain deposits on either bank. The floodplain narrows from about 100 feet wide at Bridge 36 to less than 50 feet at Bridge 35, where most of the floodplain is taken up by the road. A few houses and a church occupy the remainder of the floodplain between the two bridges and around Bridge 36.

Both existing bridges are 2-lane structures, each in a single span about 25 feet long. Both are to be replaced with 2-lane, single span bridges 45 feet long, at a skew of 135 degrees. Plans call for two retaining walls on approaches to Bridge 35 and a retaining wall on the west approach to Bridge 36. Traffic is to be diverted on temporary detours with multiple corrugated steel culverts at both sites.

MAILING ADDRESS:  
NC DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT  
1589 MAIL SERVICE CENTER  
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088  
FAX: 919-250-4237

WEBSITE: [WWW.DOH.DOT.STATE.NC.US](http://WWW.DOH.DOT.STATE.NC.US)

LOCATION:  
CENTURY CENTER COMPLEX  
BUILDING B  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC 27610

The Geotechnical Engineering Unit conducted a subsurface investigation at both bridge sites in July, 2003. Seven borings were made at Bridge 35 at proposed end bents and retaining walls, and 5 borings were made at Bridge 36 at proposed end bents and on the detour alignment. Borings were made with a CME-550 power drilling machine using a NX rotary casing advancer and NXWL rock coring equipment. One of the borings at Bridge 36 was made with 8-inch hollow stem augers.

Standard Penetration Tests (SPT's) were conducted at 5-foot intervals, and 11 soil samples were submitted to a DOT laboratory for quality analyses.

#### Foundation Materials – Bridge 35

Bouldery embankment and very bouldery alluvial gravel overlie hard rock or weathered rock at this bridge site. The surficial materials vary in thickness from about 7 feet to 12.5 feet.

So many large boulders were encountered in the surficial materials at this bridge site that it was sometimes difficult to distinguish between cored boulders and the underlying hard rock. Distinctions were made on the basis of variations in the orientation of layering and foliation and slight variations in lithology among suspected boulders, as well as on the rare recovery of a few rounded pebbles among rock cores from boulders. Depths to the base of surficial deposits should be taken as maximums, bearing in mind the possibility that some rock cored material interpreted as boulders may in fact have been hard rock in place.

#### End Bent One

A boring on the Left Side (EB1-A) found poor quality hard rock at a depth of 10.1 feet beneath embankment and alluvial gravels. The boring passed into good rock at 17.4 feet before termination at a depth of 22.9 feet.

Borings on the Right Side (EB1-B) and near the Centerline (EB1-C) found fair to good quality hard rock at depths of 7.1 and 7.0 feet, respectively, beneath very bouldery embankment soils. The borings were carried into hard rock to depths of 16.8 feet at EB1-B and 11.7 feet at EB1-C.

#### End Bent Two

A boring on the Left Side (EB2-A) found weathered rock beneath 12.4 feet of bouldery embankment and alluvial soils. Weathered rock was penetrated to the hard rock line at a depth of 16.4 feet.

A boring on the Right Side (EB2-B) encountered hard rock beneath 9.2 feet of very bouldery gravel. Rock coring from 9.2 feet to 20.7 feet penetrated poor quality hard rock with seams of weathered rock.

## Foundation Materials – Bridge 36

Approximately 4 to 7 feet of alluvial gravel overlies saprolite, weathered rock and hard rock at this site. Subsurface conditions beneath the alluvium vary considerably from one boring to another, due chiefly to the fact that the weathering profile is developed on a sequence of steeply dipping beds with contrasting compositions.

### End Bent One

A boring on the Left Side of this bent (EB1-A) found 6.0 feet of alluvial sand and gravel (A-1-b) overlying 6.1 feet of loose to medium dense, micaceous, sandy saprolite (A-2-5). Weathered rock was encountered at a depth of 12.1 feet. Core drilling was begun in hard rock (mica schist) at 14.6 feet. Coring from 14.6 feet to 20.3 feet resulted in only 28 percent recovery. Further coring to a depth of 28.3 feet resulted in virtually no recovery. SPT drilling was resumed at 28.3 feet in medium dense to hard, sandy saprolite (A-2-4) and was carried to SPT refusal at 39.6 feet.

A boring on the Right Side (EB1-B) penetrated 6 feet of alluvial gravel overlying 2.4 feet of sandy saprolite (A-2-5). Weathered rock was encountered at 8.4 feet. Core drilling was begun in hard rock (mica schist) at 9.1 feet. Recovery deteriorated from 72 percent in the interval 9.1 – 14.1 feet to only 43 percent in the interval 14.1 – 23.6 feet and 0 percent from there to termination at 28.6 feet in what was interpreted as saprolite.

### End Bent Two

A boring on the Left Side (EB1-A) found 4.2 feet of alluvial gravel (A-1-b) overlying 7.9 feet of medium dense to dense, sandy saprolite (A-2-4). The bit passed into weathered rock at a depth of 12.1 feet, and encountered hard rock at 15.9 feet. Coring from 15.9 feet to 28.2 feet penetrated alternating layers of hard rock (amphibolite) and weathered rock.

A boring on the right side found 6.7 feet of alluvial gravel overlying approximately 16 feet of very loose to loose, micaceous, sandy saprolite (A-2-4, A-2-5). The sandy saprolite became abruptly dense to very dense at a depth of 22.5 feet and continued so until weathered rock was encountered at 33.0 feet. The boring was terminated in weathered rock at 38.8 feet.

## Retaining Walls

### Bridge 35 Wall-1

A retaining wall has been proposed for the Left Side approach to Bridge 35, beginning approximately at Station 22+70, 18' LT and ending at the EB1 wing wall, approximate Station 23+20, 18 LT.

A boring at 22+70, 16' LT found 6 feet of bouldery embankment and 3 feet of bouldery alluvium overlying dense sandy saprolite (A-2-4) at a depth of 9.0 feet. The boring passed into very thin weathered rock at 11.5 feet and into hard rock at 12.1 feet. Hard rock consisting of fair quality amphibolite was cored to a depth of 22.5 feet.

A boring near the bridge end bent at 23+25, 9' LT (EB1-A) found 10.1 feet of bouldery embankment and alluvium directly overlying hard rock. The rock was cored to a depth of 22.9 feet and was found to consist of very poor to good quality amphibolite.

### Bridge 35 Wall-2

A retaining wall has been proposed for the Right Side approach to Bridge 35, beginning at the EB2 wing wall, approximate Station 24+00, 18' RT, and ending at about Station 24+20, 18' RT.

A boring near the bridge end bent at 23+96, 8' RT (same as EB2-B above) penetrated 4.0 feet of bouldery embankment and 8.4 feet of bouldery alluvium overlying hard rock at a depth of 12.4 feet. Coring to a depth of 20.7 feet penetrated very poor quality amphibolite with seams of weathered rock.

A boring at 24+20, 17' RT found 4.0 feet of bouldery embankment and 6.1 feet of bouldery alluvium overlying rock. Rock coring resulted in only 30 percent recovery, indicating a composition chiefly of weathered rock with hard rock seams.

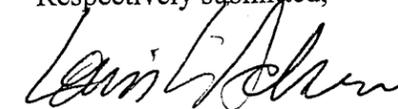
### Bridge 36 Wall-3

A retaining wall has been proposed for the Left Side approach to Bridge 36, beginning at the EB2 wing wall, at approximate Station 33+25, 18' LT, and ending about Station 33+35, 18' LT.

A boring at 33+20, 8' LT (same as EB2-A above) found 4.2 feet of alluvial gravel (A-1-b) overlying 7.9 feet of medium dense to dense, sandy saprolite (A-2-4). The bit passed into weathered rock at a depth of 12.1 feet, and encountered hard rock at 15.9 feet. Coring from 15.9 feet to 28.2 feet penetrated alternating layers of hard rock (amphibolite) and weathered rock.

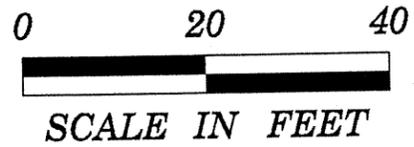
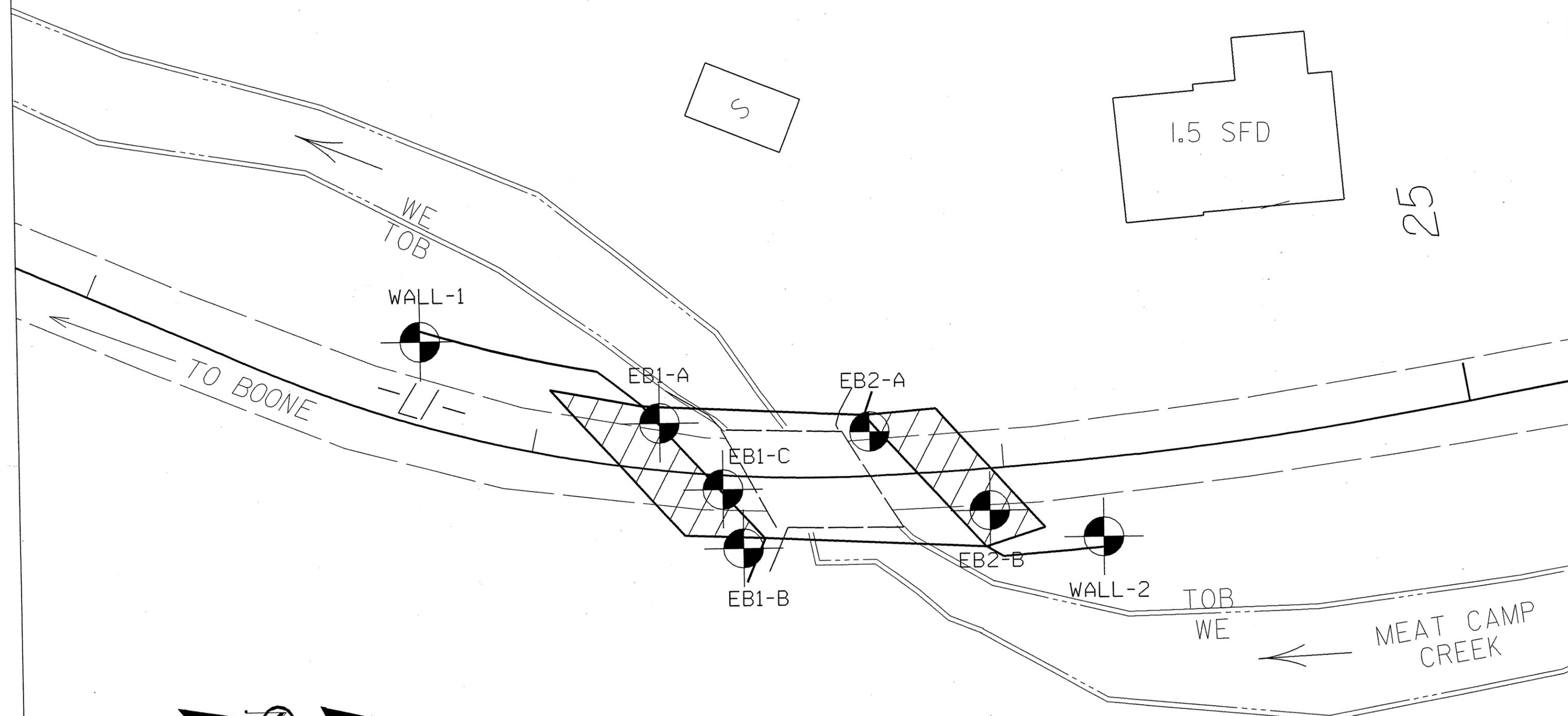
Please let us know if we can be of further assistance.

Respectively submitted,

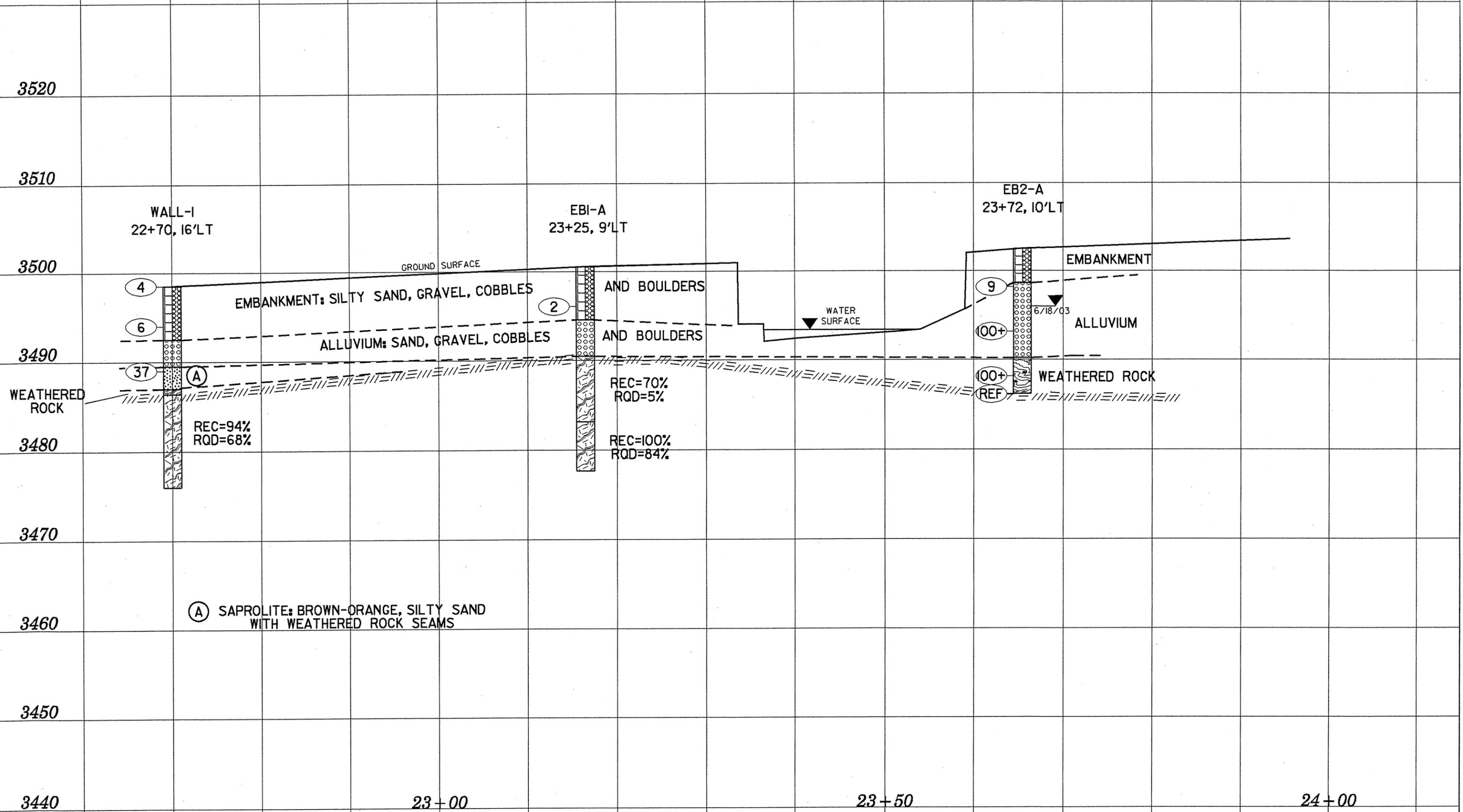


Louis L. Acker, LG  
Project Geologist

# BRIDGE NO. 35 ON SR-1340 OVER MEAT CAMP CREEK

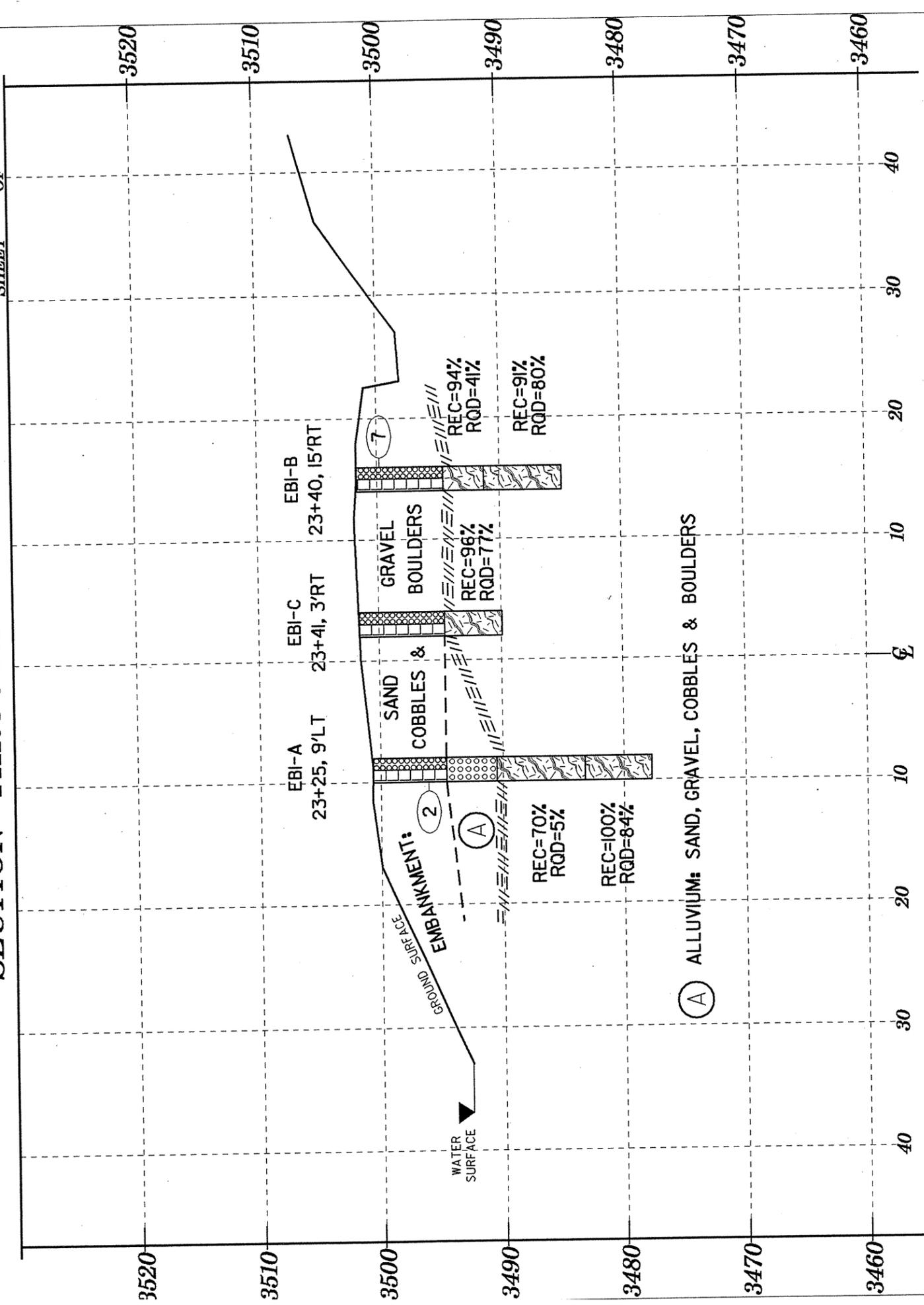


# PROFILE OF BR. 35 THROUGH LEFT SIDE BORINGS



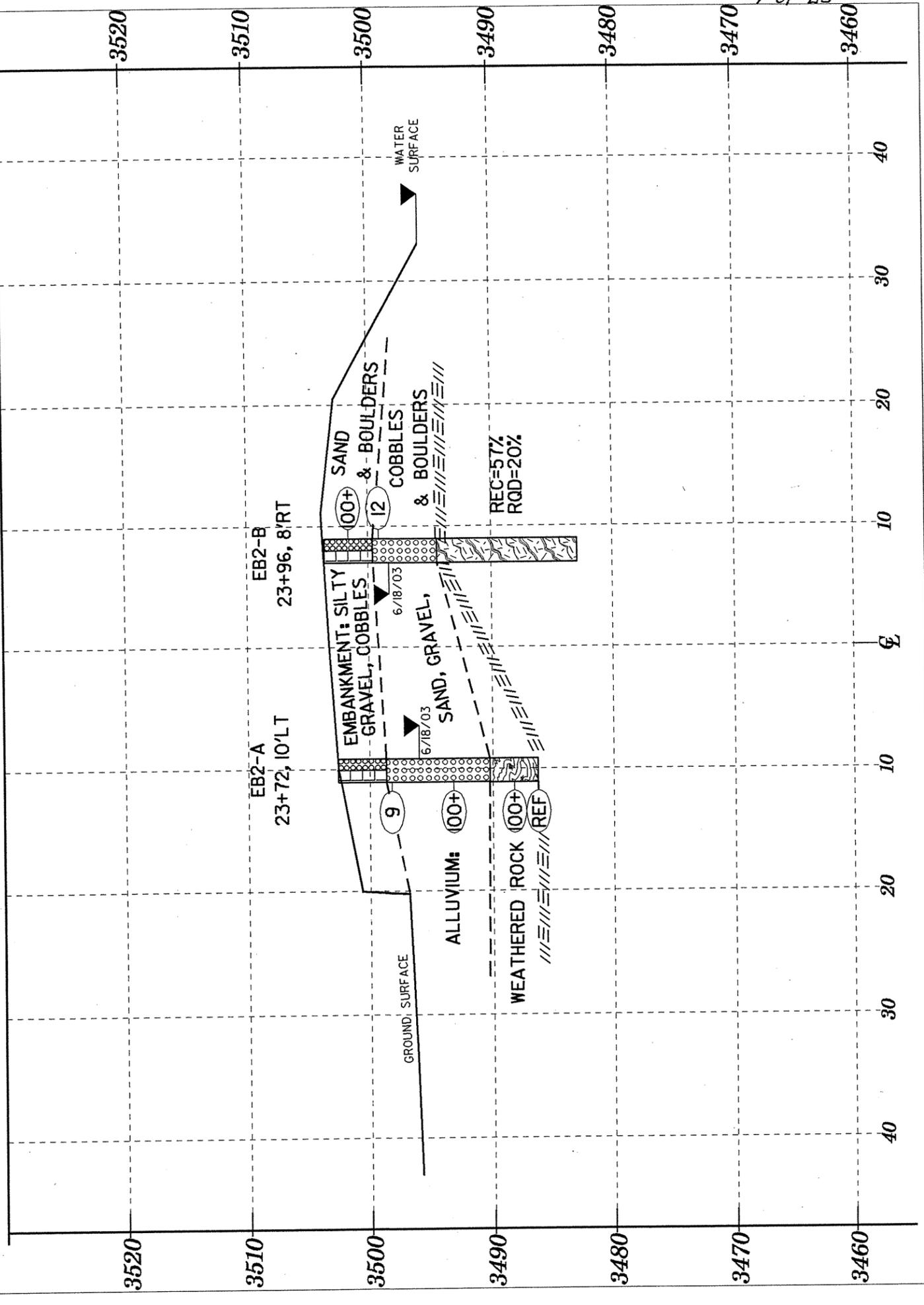
SECTION THROUGH BR. 35 EB1

PROJECT 8.2752101 (B-3926)  
COUNTY WATAUGA  
SHEET OF



SECTION THROUGH BR. 35 EB2

PROJECT 8.2752101 (B-3926)  
COUNTY WATAUGA  
SHEET OF



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER							
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK							GND WATER						
BORING NO 35-EB1A		NORTHING 0.00		EASTING 0.00		0 HR 5.80ft							
ALIGNMENT -L1-		BORING LOCATION 23+25.000		OFFSET 9.00ft LT		24 HR N/A							
COLLAR ELEV 3500.60ft		TOTAL DEPTH 22.90ft		START DATE 6/20/03		COMPLETION DATE 06/20/03							
DRILL MACHINE CME-550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 10.10ft			Log 35-EB1A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
3500.60													Ground Surface
	4.50	4	1	1	1.0	2							EMBANKMENT: SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS
													ALLUVIUM: SAND, GRAVEL, AND BOULDERS
													HARD ROCK: SLI. TO SEV. WEATHERED AMPHIBOLITE REC=70 RQD=5
													HARD ROCK: V. SLI. WEATHERED TO FRESH AMPHIBOLITE REC=100 RQD=84
													TERMINATED BORING IN HARD ROCK AT ELEVATION 3477.7 FEET

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER							
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK							GND WATER						
BORING NO 35-EB1B		NORTHING 0.00		EASTING 0.00		0 HR 1.50ft							
ALIGNMENT -L1-		BORING LOCATION 23+45.000		OFFSET 15.00ft RT		24 HR N/A							
COLLAR ELEV 3501.70ft		TOTAL DEPTH 16.80ft		START DATE 6/19/03		COMPLETION DATE 06/19/03							
DRILL MACHINE CME 550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 7.10ft			Log 35-EB1B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
3501.70	0.00	2	3	4	1.0								Ground Surface
3500.00						7							EMBANKMENT: BOULDERS IN SILTY SAND AND GRAVEL
													HARD ROCK: V. SLI. WEATHERED AMPHIBOLITE REC=94 RQD=41
													HARD ROCK: FRESH AMPHIBOLITE REC=91 RQD=80
													TERMINATED BORING IN HARD ROCK AT ELEVATION 3484.9 FEET



### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER						
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK							GND WATER					
BORING NO 35-EB2A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L1-		BORING LOCATION 23+72.000		OFFSET 10.00ft LT		24 HR 6.60ft						
COLLAR ELEV 3502.60ft		TOTAL DEPTH 16.40ft		START DATE 6/18/03		COMPLETION DATE 06/18/03						
DRILL MACHINE CME 550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 16.40ft			Log 35-EB2A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
3502.60												Ground Surface
3500.00	4.40	4	2	7	1.0				9			EMBANKMENT: SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS
										SS-1	W	ALLUVIUM: SILTY CSE SAND AND GRAVEL WITH COBBLES AND BOULDERS
	9.40	18	35	65	0.9						SAT	WEATHERED ROCK
3490.00	14.40	34	50	50	0.8							WEATHERED ROCK
3486.20												TERMINATED BORING ON HARD ROCK AT ELEVATION 3486.2 FEET

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER						
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK							GND WATER					
BORING NO 35-EB2B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L1-		BORING LOCATION 23+96.000		OFFSET 8.00ft RT		24 HR 5.30ft						
COLLAR ELEV 3503.60ft		TOTAL DEPTH 20.70ft		START DATE 6/18/03		COMPLETION DATE 06/18/03						
DRILL MACHINE CME 550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 9.20ft			Log 35-EB2B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
3503.60												Ground Surface
3500.00	2.00	11	100	0.2								EMBANKMENT: SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS
	4.50	7	9	3	1.0				12			ALLUVIUM: CSE SAND AND GRAVEL WITH COBBLES AND BOULDERS
												HARD ROCK: SLI. TO SEV. WEATHERED AMPHIBOLITE WITH WEATHERED ROCK SEAMS REC=57 RQD=20
3490.00												
3482.90												TERMINATED BORING IN HARD ROCK AT ELEVATION 3482.9 FEET

PROJECT NO: 8.2752101 (B-3926)  
 COUNTY: WATAUGA

BRIDGE 35  
 EB1-A



CORE 1: 6.6 – 8.1	REC=80% RQD=40%
CORE 2: 8.1 – 13.1	REC=72% RQD=7%
CORE 3: 13.1 – 18.1	REC=52% RQD=10%
CORE 4: 18.1 – 22.9	REC=98% RQD=83%

LAYER 1: 6.6 – 10.1 Boulders

LAYER 2: 10.1 – 17.4 Hard to medium hard, slightly to severely weathered amphibolite. Close-fractured, 35 pieces, longest piece 0.4 feet. Layering steeply dipping and contorted, foliation dips 60-70 degrees. At least 17 joints at 0-20 degrees, 4 joints at 30-60 degrees, moderately rough, coated with Fe- and Mn-oxides. 4 smooth joints at 60-70 degrees. All joints coated with Fe- and Mn-oxides. REC=70% RQD=5%

LAYER 3: 17.4 – 22.9 Hard, very slightly weathered to fresh amphibolite. Close-fractured, 19 pieces, longest piece 1.1 ft. Layering and foliation dip 50-60 degrees, contorted in some places. 6 joints at 0-20 degrees, rough, clean. 3 joints at 30-60 degrees, moderately rough to smooth, coated with Fe-oxide. 1 joint at 70 degrees, smooth, coated with Fe- and Mn-oxides. REC=100% RQD=84%

PROJECT NO: 8.2752101 (B-3926)  
 COUNTY: WATAUGA

BRIDGE 35  
 EB1-B



CORE 1: 1.9 – 3.5	REC=75% RQD=44%
CORE 2: 3.5 – 8.5	REC=46% RQD=32%
CORE 3: 8.5 – 12.7	REC=98% RQD=48%
CORE 4: 12.7 – 16.8	REC=88% RQD=85%

LAYER 1: 1.9 – 7.1 Boulders

LAYER 2: 7.1 – 10.4 Hard, very slightly weathered, green to dark gray epidiosic amphibolite. Close-fractured, 21 pieces, longest piece 0.6 feet. Very thin, contorted layering dips 40-90 degrees. Poorly developed foliation dips 60 degrees. 13 joints at 20-50 degrees, smooth to moderately rough. 4 joints at 60-80 degrees, smooth. All joints coated with Fe-oxide. REC=94% RQD=41%

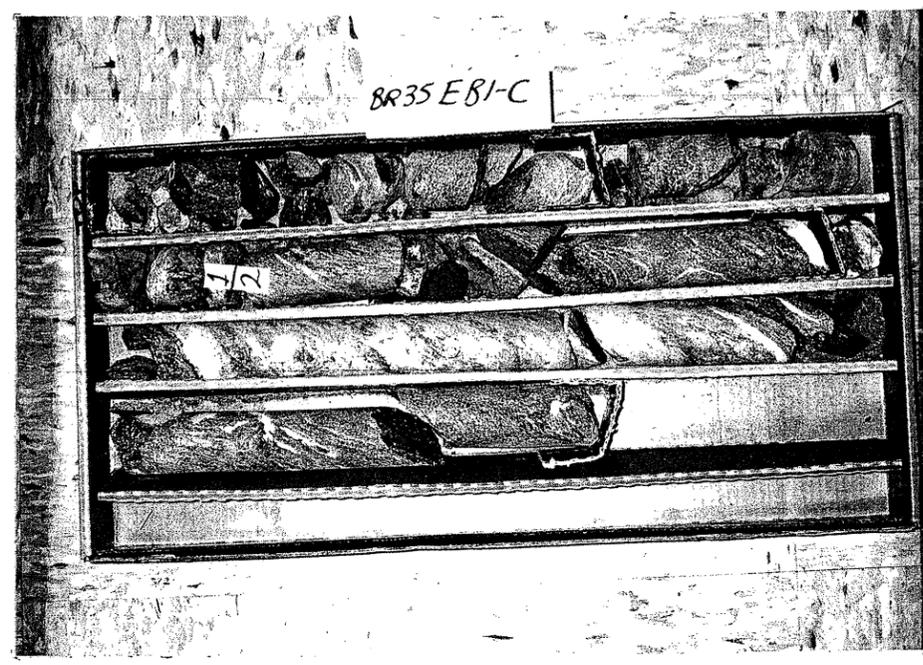
LAYER 3: 10.4 – 16.8 Hard, fresh amphibolite. Close- to moderately close-fractured, 11 pieces, longest piece 1.7 feet. Poorly foliated at 60 degrees. 7 joints at 0-20 degrees, moderately rough, clean or with a little Fe-oxide. 1 joint at 60 degrees, smooth, coated with chlorite slickensides. REC=91% RQD=80%

PROJECT NO: 8.2752101 (B-3926)  
COUNTY: WATAUGA

PROJECT NO: 8.2752101 (B-3926)  
COUNTY: WATAUGA

BRIDGE 35  
EB1-C

BRIDGE 35  
EB2-B



CORE 1: 2.0 - 3.4	REC=86% RQD=0%
CORE 2: 3.4 - 8.4	REC=48% RQD=20%
CORE 3: 8.4 - 11.7	REC=91% RQD=76%

CORE 1: 6.9 - 8.2	REC=12% RQD=0%
CORE 2: 8.2 - 12.1	REC=69% RQD=31%
CORE 3: 12.1 - 16.1	REC=35% RQD=10%
CORE 4: 16.1 - 20.7	REC=72% RQD=14%

LAYER 1: 2.0 - 7.0 Boulders

LAYER 1: 6.9 - 9.2 Boulders

LAYER 2: 7.0 - 11.7 Hard, very slightly weathered amphibolite. Close-fractured, 16 pieces, longest piece 1.1 feet. 4 joints at 0-20 degrees, moderately rough. 4 joints at 40-60 degrees, moderately rough to rough. 5 joints at 60-70 degrees, moderately rough to rough. All joints are clean or coated with a little Fe-oxide. REC=96% RQD=77%

LAYER 2: 9.2 - 20.7 Soft to hard, slightly to severely weathered amphibolite with seams of weathered rock and saprolite. Very close- to close-fractured, longest piece 0.7 feet. Joints numerous and indeterminate. REC=57% RQD=20%

GEOTECHNICAL ENGINEERING UNIT FIELD SCOUR REPORT

PROJECT: 8.2752101 ID: B-3926 COUNTY: WATAUGA

DESCRIPTION(1): BRIDGE NO. 35 ON SR-1340 OVER COVE CREEK

INFORMATION ON EXISTING BRIDGES Information obtained from:  field inspection  
 microfilm(Reel: \_\_\_\_\_ Pos: \_\_\_\_\_)  
 other \_\_\_\_\_

COUNTY BRIDGE NO. 35 BRIDGE LENGTH 26 FT NO. BENTS IN: CHANNEL \_\_\_\_\_ FLOOD PLAIN 2

FOUNDATION TYPE: \_\_\_\_\_

**EVIDENCE OF SCOUR(2):**

ABUTMENTS OR END BENT SLOPES: HARD FLOW AGAINST EB1, EDDY SCOUR ON EB2

INTERIOR BENTS: N/A

CHANNEL NONE

CHANNEL BANKS: NONE

**EXISTING SCOUR PROTECTION:**

TYPE(3): NONE

EXTENT(4): \_\_\_\_\_

EFFECTIVENESS(5): \_\_\_\_\_

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): NONE

**DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): GRAVEL AND BOULDERS

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): GRAVEL AND BOULDERS

FOUNDATION BEARING MATERIAL(9): ROCK

CHANNEL BANK COVER(10) TREES, BRUSH, GRASS

FLOOD PLAIN WIDTH(11): NONE

FLOOD PLAIN COVER(12): N/A

**DESIGN INFORMATION CONT.**

STREAM IS  DEGRADING \_\_\_\_\_ AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: \_\_\_\_\_

CHANNEL MIGRATION TENDENCY (14): EAST AGAINST EB1

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15): \_\_\_\_\_

EBI-A	3490.0 FT
EB1-B	3494.5 FT
EB2-A	3489.5 FT
EB2-B	3494.5 FT

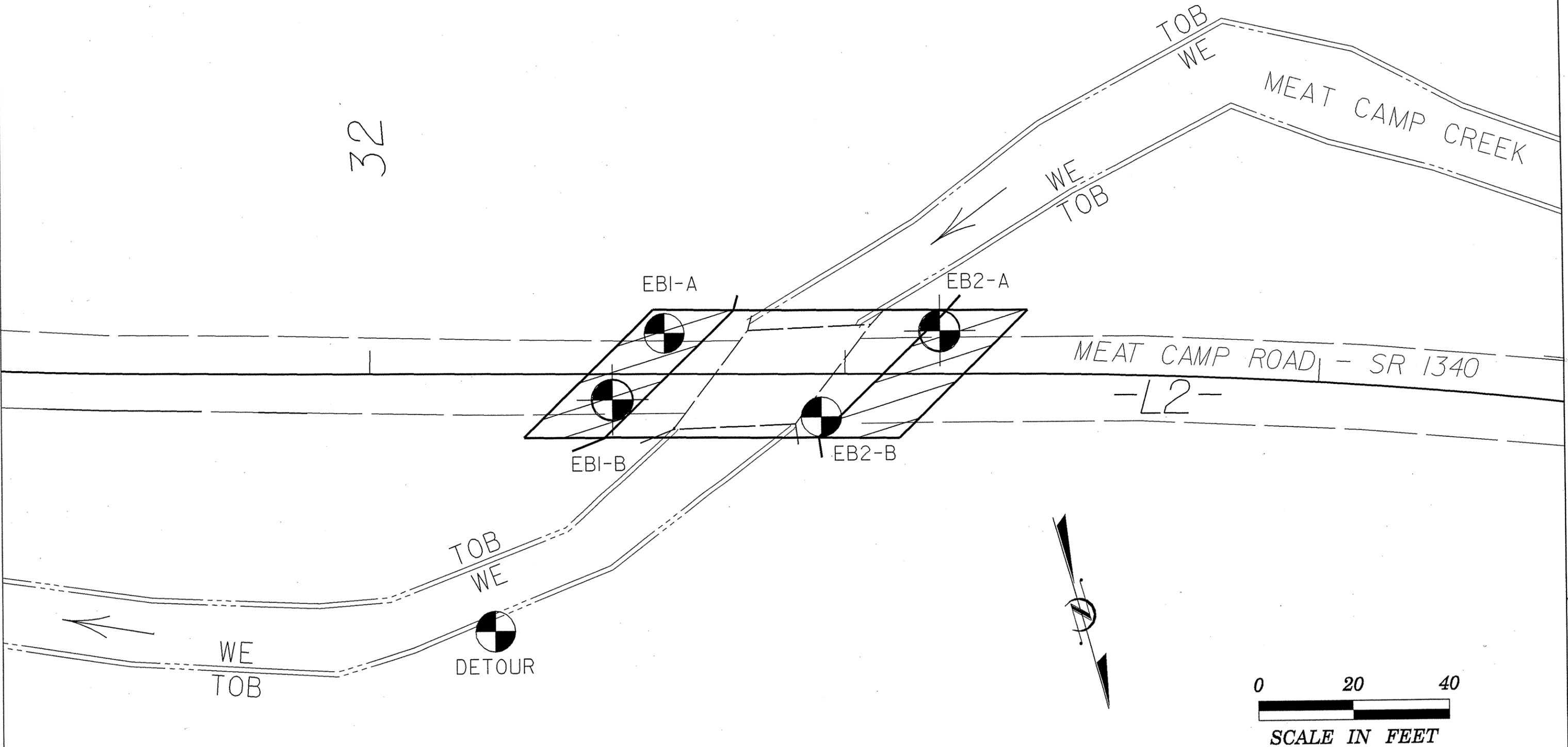
REPORTED BY: L. L. ACKER DATE: 6/20/03

**INSTRUCTIONS**

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL,
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

# BRIDGE NO. 36 ON SR-1340 OVER MEAT CAMP ROAD

32



# PROFILE OF BR. 36 THROUGH LEFT SIDE BORINGS

3550

3540

3530

3520

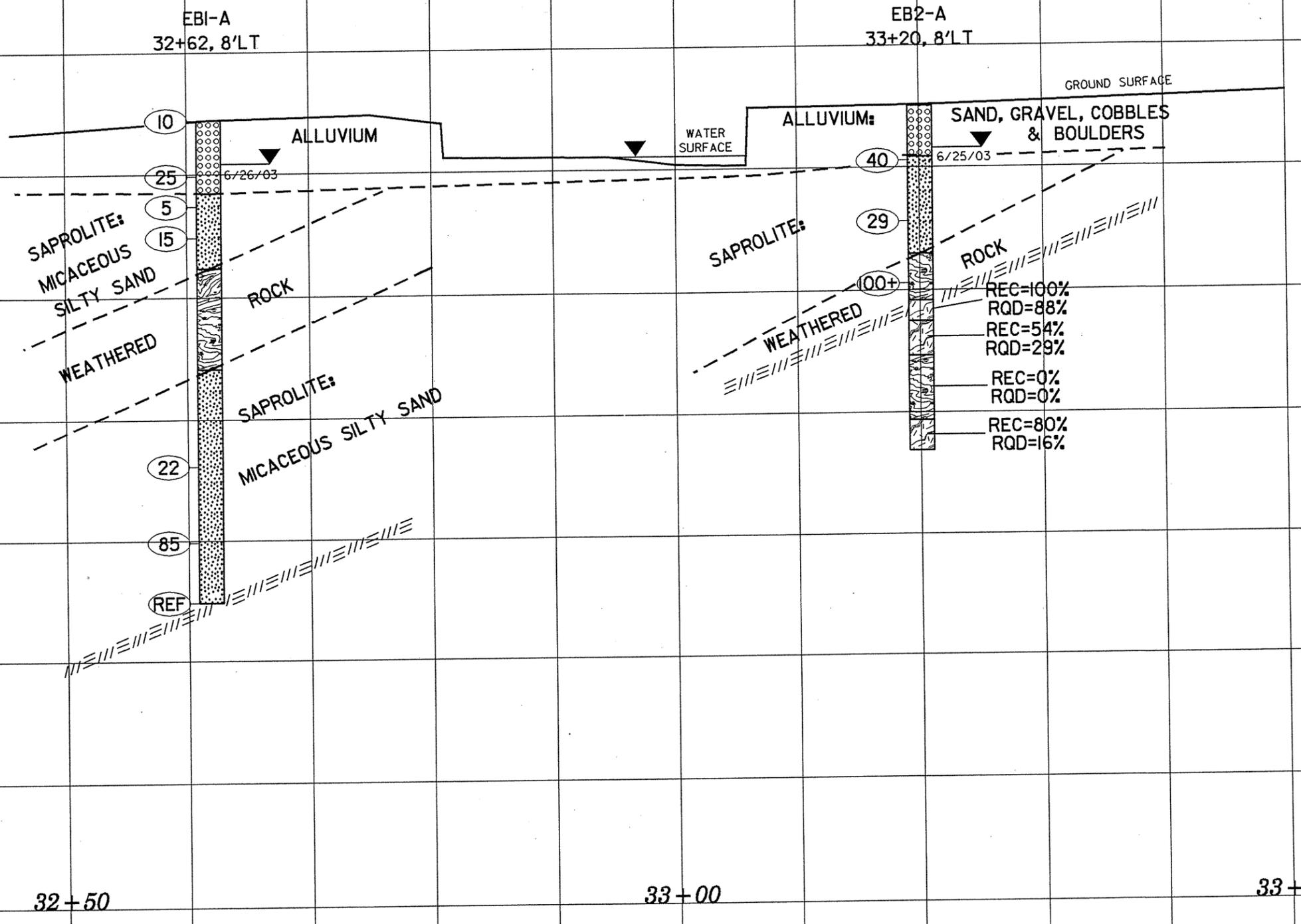
3510

3500

3490

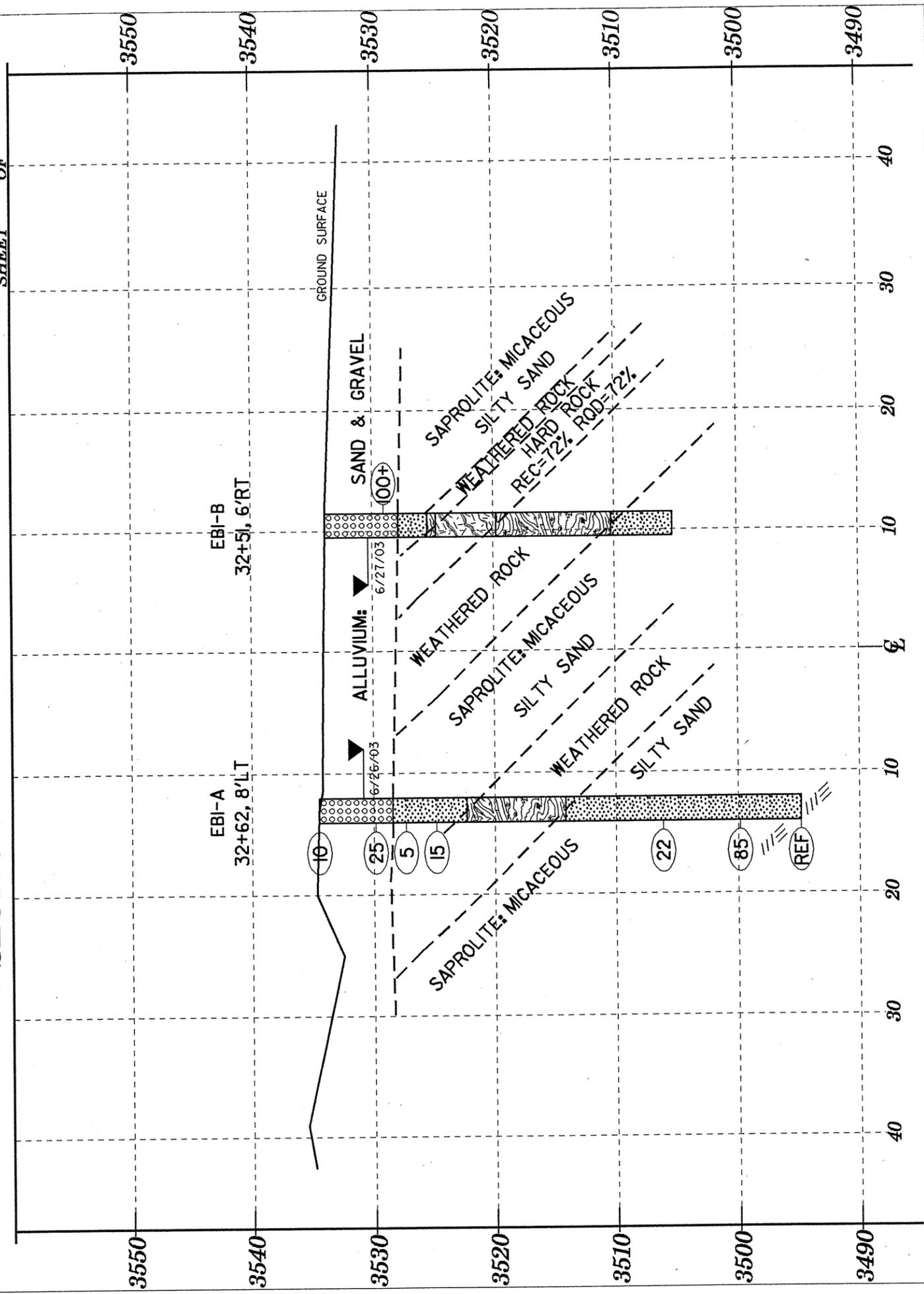
3480

3470



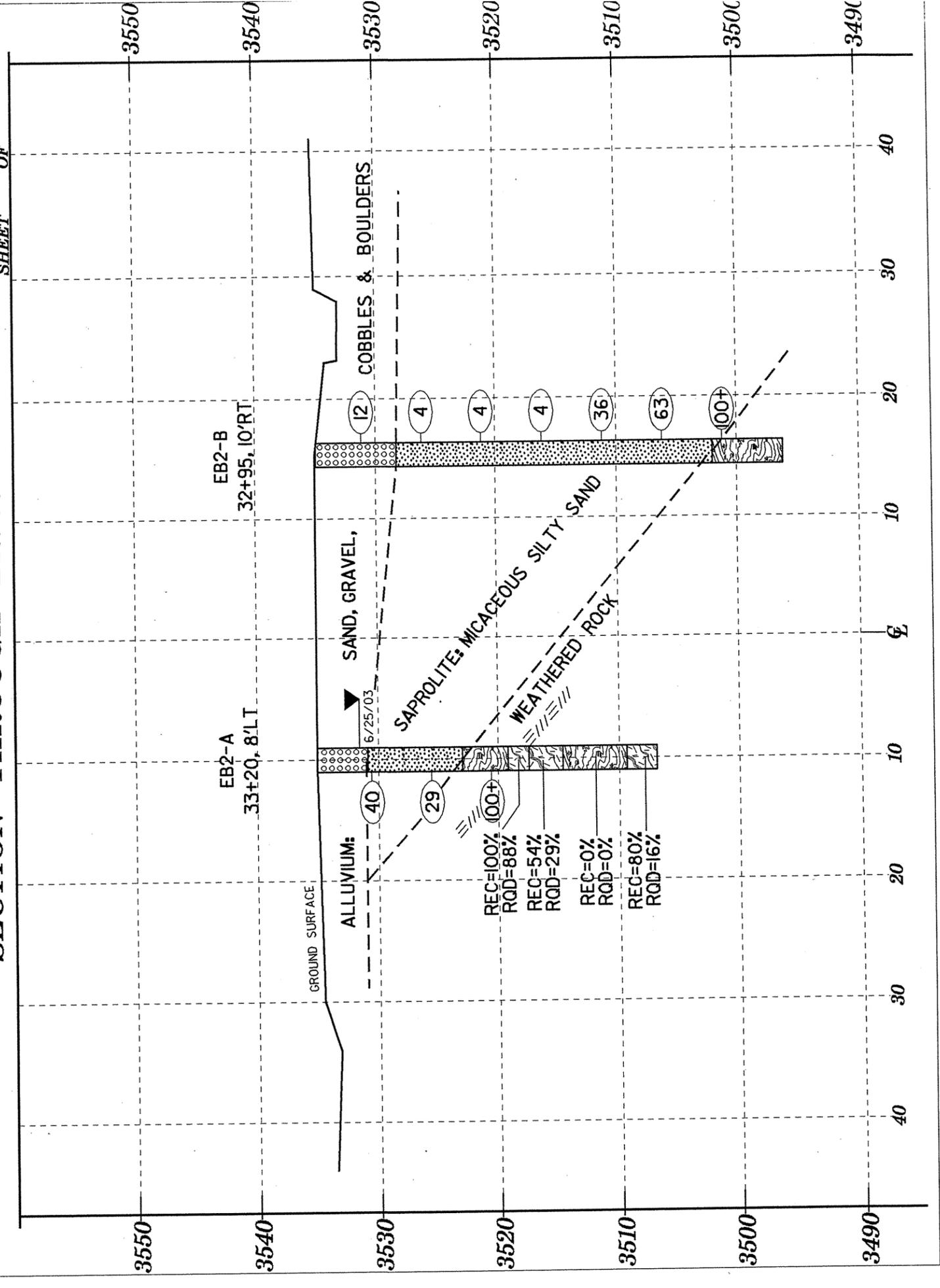
SECTION THROUGH BR. 36 EB1

PROJECT 8.2752101 (B-3926)  
 COUNTY WATAUGA  
 SHEET OF



PROJECT 8.2752101 (B-3926)  
 COUNTY WATAUGA  
 SHEET OF

SECTION THROUGH BR. 36 EB2





**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG**

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG**

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER							
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK						GND WATER							
BORING NO 36-EB2A						0 HR N/A							
ALIGNMENT -L2-						24 HR 3.50ft							
COLLAR ELEV 3535.10ft		TOTAL DEPTH 28.20ft		START DATE 6/24/03		COMPLETION DATE 06/24/03							
DRILL MACHINE CME 550				DRILL METHOD ROTARY W/O MUD		HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH				DEPTH TO ROCK 15.90ft		Log 36-EB2A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG MOI	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
3535.10													Ground Surface
3530.00	4.50	29	24	16	1.0							SS-4	W ALLUVIUM: SAND AND GRAVEL WITH COBBLES AND BOULDERS
	9.50	13	10	19	1.0							SS-5	W SAPROLITE: GREY-BROWN TO RED-BROWN, SILTY SAND
3520.00	14.50	60	40	0.7									WEATHERED ROCK
													HARD ROCK: SLI. WEATHERED AMPHIBOLITE REC=100 RQD=89
													HARD ROCK: MOD. TO SEV. WEATHERED AMPHIBOLITE REC=54 RQD=29
3510.00													WEATHERED ROCK: REC=0 RQD=0
3506.90													HARD ROCK: MOD. TO SEV. WEATHERED AMPHIBOLITE REC=80 RQD=16
													TERMINATED BORING IN WEATHERED ROCK AT ELEVATION 3506.9 FEET

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST L.L. ACKER							
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK						GND WATER							
BORING NO 36-EB2B						0 HR 2.80ft							
ALIGNMENT -L2-						24 HR N/A							
COLLAR ELEV 3535.00ft		TOTAL DEPTH 38.80ft		START DATE 6/25/03		COMPLETION DATE 06/25/03							
DRILL MACHINE CME 550				DRILL METHOD ROTARY W/O MUD		HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH				DEPTH TO ROCK N/A		Log 36-EB2B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG MOI	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
3535.00													Ground Surface
3530.00	3.80	5	7	5	1.0								ALLUVIUM: SAND AND GRAVEL WITH COBBLES AND BOULDERS
	8.80	1	2	2	1.0								SAPROLITE: LIGHT BROWN, MICACEOUS, SILTY SAND
3520.00	13.80	1	2	2	1.0								
	18.80	1	1	3	1.0							SS-9	
3510.00	23.80	4	12	24	1.0								
	28.80	15	33	30	1.0								
3500.00	33.80	32	64	36	0.7								WEATHERED ROCK: SEVERELY WEATHERED, MICACEOUS, GRANITE GNEISS
3496.20													TERMINATED BORING IN WEATHERED ROCK AT ELEVATION 3496.2 FEET

PROJECT NO: 8.2752101 (B-3926)  
COUNTY: WATAUGA

BRIDGE 36  
EB1-A



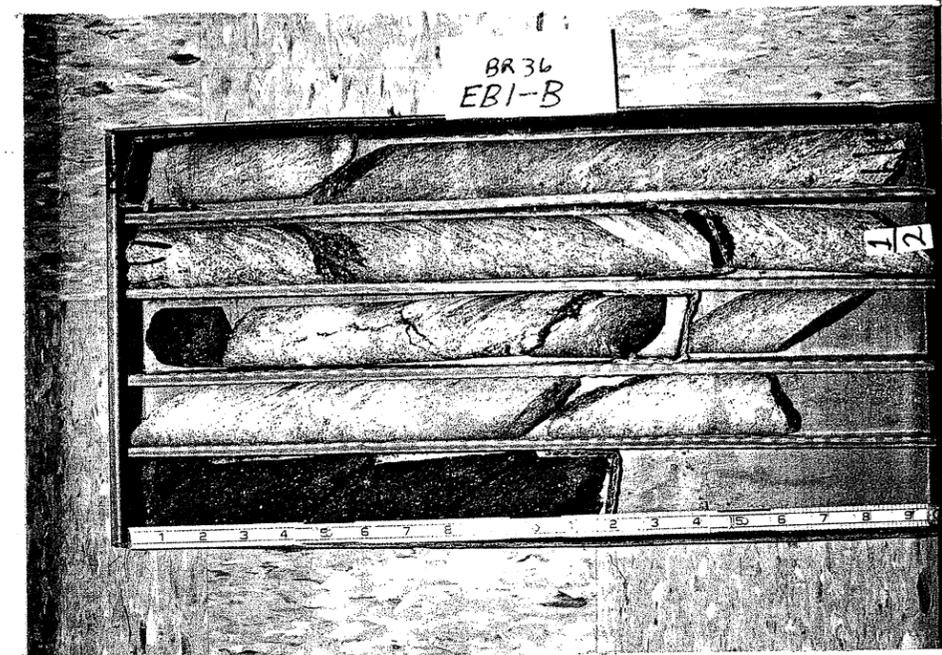
CORE 1: 14.6 – 18.3	REC=32% RQD=0%
CORE 2: 18.3 – 23.3	REC=8% RQD=0%
CORE 3: 23.3 – 28.3	REC=<1% RQD=0%

LAYER 1: 14.6 – 20.3 Weathered rock and saprolite (not recovered) with few seams of hard, slightly weathered amphibolite. REC=28% RQD=0%

LAYER 2: 20.3 – 28.3 Saprolite and weathered rock with thin seam of hard amphibolite. REC = <1% RQD=0%

PROJECT NO: 8.2752101 (B-3926)  
COUNTY: WATAUGA

BRIDGE 36  
EB1-B



CORE 1: 9.1 – 13.6	REC=69% RQD=69%
CORE 2: 13.6 – 18.6	REC=34% RQD=24%
CORE 3: 18.6 – 23.6	REC=58% RQD=28%

LAYER 1: 9.1 – 14.1 Moderately hard, slightly weathered mica schist. Moderately close-fractured, 3 pieces, longest piece 1.6 feet. Well foliated at 60 degrees. 3 joints on foliation, rough, coated with Fe-oxide. No recovery from weathered seam at 9.5-10.9. REC=72% RQD=72%

LAYER 2: 14.1 – 23.6 Moderately hard, slightly to severely weathered mica schist interlayered with weathered rock and/or saprolite (not recovered). 9 pieces, longest piece 0.9 feet. Well foliated at 50-60 degrees. Joints indeterminate. REC=43% RQD=22%

PROJECT NO: 8.2752101 (B-3926)  
COUNTY: WATAUGA

BRIDGE 36  
EB2-A



CORE 1: 15.9 – 18.2	REC=98% RQD=78%
CORE 2: 18.2 – 23.2	REC=20% RQD=14%
CORE 3: 23.2 – 28.2	REC=40% RQD=8%

LAYER 1: 15.9 – 17.6 Hard, slightly weathered amphibolite. Moderately close-fractured, 2 pieces, longer piece 1.5 feet. Poorly foliated at 70 degrees. 1 joint on foliation, moderately rough, with Fe-oxide stain. REC=100% RQD=83%

LAYER 2: 17.6 – 20.4 Moderately hard, moderately to severely weathered amphibolite with weathered rock seams (not recovered). Close-fractured, 7 pieces, longest piece 0.4 feet. Joints indeterminate. REC=54% RQD=29%

LAYER 3: 20.4 – 25.7 Weathered rock and/or saprolite. REC=0% RQD=0%

LAYER 4: 25.7 – 28.2 Moderately hard, moderately to severely weathered amphibolite. Close- to very close-fractured, 13 pieces plus rubble, longest piece 0.4 feet. Joints indeterminate. REC=80% RQD=16%

GEOTECHNICAL ENGINEERING UNIT FIELD SCOUR REPORT

PROJECT: 8.2752101 ID: B-3926 COUNTY: WATAUGA

DESCRIPTION(1): BRIDGE NO. 36 ON SR-1340 OVER MEAT CAMP CREEK

**INFORMATION ON EXISTING BRIDGES** Information obtained from:  field inspection  
 microfilm(Reel: \_\_\_\_\_ Pos: \_\_\_\_\_)  
 other \_\_\_\_\_

COUNTY BRIDGE NO. 36 BRIDGE LENGTH 26 FT NO. BENTS IN: CHANNEL \_\_\_\_\_ FLOOD PLAIN 2

FOUNDATION TYPE: \_\_\_\_\_

**EVIDENCE OF SCOUR(2):**

ABUTMENTS OR END BENT SLOPES: HARD FLOW AGAINST EBI-B AND EB2-A CAUSING SCOUR

INTERIOR BENTS: N/A

CHANNEL YES \_\_\_\_\_

CHANNEL BANKS: NONE

**EXISTING SCOUR PROTECTION:**

TYPE(3): NONE

EXTENT(4): \_\_\_\_\_

EFFECTIVENESS(5): \_\_\_\_\_

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): NONE

**DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): GRAVEL AND BOULDERS

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): SAND, GRAVEL AND BOULDERS

FOUNDATION BEARING MATERIAL(9): SAPROLITE AND ROCK

CHANNEL BANK COVER(10) TREES AND BRUSH

FLOOD PLAIN WIDTH(11): 100 FEET

FLOOD PLAIN COVER(12): ROADWAY, GRASSY YARD, LIGHT BRUSH

**DESIGN INFORMATION CONT.**

STREAM IS  DEGRADING \_\_\_\_\_ AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: \_\_\_\_\_

CHANNEL MIGRATION TENDENCY (14): EAST AGAINST EB1

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15): \_\_\_\_\_

EBI-A	3522.0 FT
EB1-B	3525.0 FT
EB2-A	3522.0 FT
EB2-B	3510.0 FT

REPORTED BY: L. L. ACKER DATE: 6/20/03

**INSTRUCTIONS**

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
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- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL,
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.



PROJECT NO: 8.2752101 (B-3926)  
 COUNTY: WATAUGA

BRIDGE 35  
 WALL 1

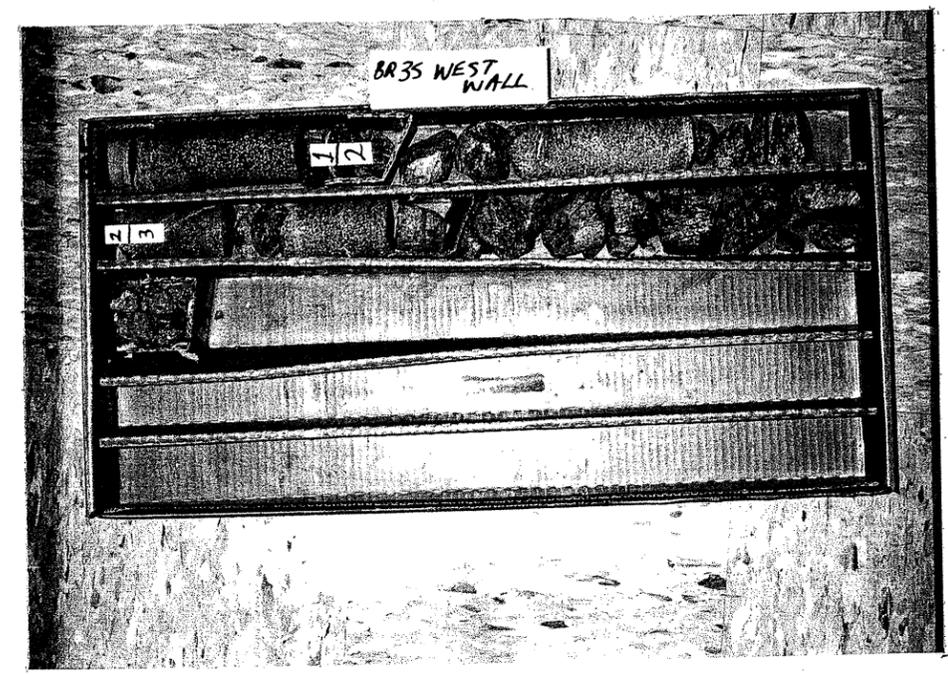


CORE 1: 12.1 - 17.9      REC=90% RQD=66%  
 CORE 2: 17.9 - 22.5      REC=100% RQD=72%

LAYER 1: 12.1 - 22.5 Hard, slightly weathered amphibolite. Close-fractured, 40 pieces, longest piece 1.4 feet. Foliation and very thin layering dip 60 degrees, or folded in some places. 4 intervals with rubble where high- and low-angle joints intersect. 11 joints at 0-20 degrees, moderately rough, clean. 6 joints at 30-50 degrees, moderately rough, clean or coated with Fe-oxide. 4 joints at 60-90 degrees, smooth, clean or coated with Fe-oxide. REC=94% RQD=68%

PROJECT NO: 8.2752101 (B-3926)  
 COUNTY: WATAUGA

BRIDGE 35  
 WALL 2



CORE 1: 7.0 - 8.1      REC=64% RQD=0%  
 CORE 2: 8.1 - 13.1      REC=40% RQD=9%  
 CORE 3: 13.1 - 17.2      REC=29% RQD=0%

LAYER 1: 7.0 - 8.1 Boulder

LAYER 2: 8.1 - 10.1 Probable boulders

LAYER 3: 10.1 - 17.2 Soft to hard, severely weathered to fresh amphibolite with seams of weathered rock and saprolite. Very close-fractured, mostly rubble recovered, longest piece 0.3 feet. REC=30% RQD=0%

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG**

PROJECT NO 8.2752101		ID B-3926		COUNTY WATAUGA		GEOLOGIST T. B. DANIEL						
SITE DESCRIPTION BR. 35 & 36 ON SR 1340 OVER MEAT CAMP CREEK							GND WATER					
BORING NO DETOUR		NORTHING 0.00		EASTING 0.00		0 HR N/A	24 HR N/A					
ALIGNMENT -DET2-		BORING LOCATION 11+48.000		OFFSET 25.00ft RT								
COLLAR ELEV 3533.40ft		TOTAL DEPTH 15.90ft		START DATE 6/26/03		COMPLETION DATE 06/26/03						
DRILL MACHINE CME 550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			Log DETOUR, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
3533.40												
3530.00	4.40	4	6	5	1.0							ALLUVIUM: SAND AND GRAVEL WITH BOULDERS AND COBBLES
	9.40	1	2	2	1.0							SAPROLITE: YELLOW-BROWN, MICACEOUS, SILTY SAND
3520.00	14.40	12	20	15	1.0							SAPROLITE: YELLOW-BROWN, MICACEOUS, FINE SANDY, SILTY CLAY
3517.50												SAPROLITE: BROWN-GRAY, SILTY SAND
												TERMINATED BORING IN SAPROLITE AT ELEVATION 3517.5 FEET

JJL  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

M&T 503E

JJL  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: B-3926

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	8.2752101	COUNTY:	Watauga	Owner:	--
DATE SAMPLED:	6-18-03	DATE RECEIVED:	7-1-03	DATE REPORTED:	7-22-03
SAMPLED FROM:	Rdw - Foundation	SAMPLED BY:	L L Acker		
SUBMITTED BY:	W D Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Lab Sample No. A-	142042	142043	142044	142045	142046	142047	142048	142049
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	74	81	91	78	99	100	98	100
Passing #40 Sieve %	63	69	61	67	78	82	77	77
Passing #200 Sieve %	31	42	23	23	26	17	20	25

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	27	24	51	30	38	39	36	41
Fine Sand - Ret. #270	38	30	28	51	43	51	53	44
Silt 0.05-0.005 mm %	25	25	11	17	15	8	9	11
Clay < 0.005 mm %	10	21	10	2	4	2	2	4
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	33	37	39	23	33	48	35	35
Plastic Index	NP	11	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-4 (0)	A-6 (2)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	23+72 Lt	24+20 Rt	22+70 Lt	33+20 Lt	33+20 Lt	32+62 Lt	32+62 Lt	32+62 Lt
Hole No.	-L- EB2-A	-L-	-L-	-L- EB2-A	-L- EB2-A	-L- EB1-A	-L- EB1-A	-L- EB1-A
Depth (ft) From:	4.9	.5	.5	4.5	10.0	7.6	28.8	35.1
To:	5.9	1.5	1.5	6.0	11.0	8.6	29.8	36.1

**Remarks:**

A-142042 through A-142052

CC:

W D Frye

J J Lail

File

SOILS ENGINEER:

T.I.P. ID #: B-3926

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	8.2752101	COUNTY:	Watauga	Owner:	--
DATE SAMPLED:	6-26-03	DATE RECEIVED:	7-1-03	DATE REPORTED:	7-22-03
SAMPLED FROM:	Rdw - Foundation	SAMPLED BY:	L L Acker		
SUBMITTED BY:	W D Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-9	SS-10	SS-11				
Lab Sample No. A-	142050	142051	142052				
HiCAMS Sample #	--	--	--				
Retained #4 Sieve %	--	--	--				
Passing #10 Sieve %	99	82	99				
Passing #40 Sieve %	84	74	94				
Passing #200 Sieve %	27	30	61				

**MINUS #10 FRACTION**

Soil Mortar - 100%							
Coarse Sand -Ret. #60	33	20	13				
Fine Sand - Ret. #270	50	52	37				
Silt 0.05-0.005 mm %	11	20	36				
Clay < 0.005 mm %	6	8	14				
Passing # 40 Sieve %	--	--	--				
Passing # 200 Sieve %	--	--	--				

Liquid Limit	43	33	61				
Plastic Index	NP	NP	21				
AASHTO Classification	A-2-5 (0)	A-2-4 (0)	A-7-5 (12)				
Quantity							
Texture							
Station	32+95 Rt	11+48 Rt	11+48 Rt				
Hole No.	-L-	Det 2	Det 2				
Depth (ft) From:	19.3	4.9	9.9				
To:	20.3	5.9	10.9				

**Remarks:**

A-142042 through A-142052

CC:

W D Frye

J J Lail

File

SOILS ENGINEER: